HOW INDUSTRY FUNDS RESEARCH

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The Grape Research News is published at the New York State Agricultural Experiment Station in Geneva, New York, with funds provided by the New York Wine and Grape Foundation. The research reported in the News is funded in large part by the New York and Pennsylvania grape industry with a match provided by the Foundation. Until now the News has only been sent to New York growers, but beginning with this issue it is also being sent to Pennsylvania grape growers in the Lake Erie region. For this reason, this is an excellent time to review how the grape industry, primarily that based on Concord and Niagara production, funds research conducted by Cornell and Penn State researchers that is needed by the industry.

Although there are some site-specific problems related to growing Concord and Niagara grapes in the Lake Erie Region, there are many problems shared by most growers. Research needed to address these problems is expensive and, in a time of declining government support for research, agricultural industries are having to share more of the cost. This led the industry in the Lake Erie Region of New York and Pennsylvania to establish the Lake Erie Regional Grape Program. It's membership, which includes all the major Lake Erie grape producers and processors, has contributed funds to support viticultural research on problems specific to the Lake Erie Region.

For many years before the Lake Erie Grape Program was established, New York has had an industry fund to support research. This is called the Grape Production Research Fund. Industry leaders who administer the Fund support research projects that benefit not only the Lake Erie Region but other regions of New York State, especially the Finger Lakes.

The two Funds may differ somewhat in their commitment to funding short-term versus long-term research, but the general philosophy of both organizations is to support research needed to ensure the success of the industry, to identify impediments to the industry being more successful, and to provide funds for researchers to solve problems or develop new technologies needed for the industry to be competitive. Major identified goals are to increase production and quality, to lower production costs per acre, and to ensure that growers have integrated pest management (IPM) methods that are cost effective and environmentally sound.

Contributors to one or both of these funds are National Grape Cooperative, Clifftstar Corp., Red Wing Co., Seneca Foods, Canandaigua Wine Company, Glenora Wine Cellars, Mogen David Wine Corp., Coca Cola Foods, Growers Cooperative Inc., and Meier’s Wine Cellars of Ohio. The amount of money contributed to the Lake Erie Fund is based on production figures, with the current contributions set at $.75 per ton at the processor's gate. This figure is established each year in January. A portion of this money (45 percent or currently $.35 per ton) is contributed to support the Grape Production Research Fund, which addresses problems of grape growers in the Finger Lakes Region as well as the Lake Erie Region, and each year a dollar amount also is committed to support the Lake Erie Regional Grape Extension Program.

The process for determining which research projects will be supported by the Lake Erie Program and/or the Grape Production Research Fund is controlled by the industry, and is closely coordinated between the two Funds and the New York Wine and Grape Foundation. The first step is for the Directors of the New York State Agricultural Experiment Station at Geneva (continued on page 2)
FROM THE EDITOR

Martin Goffinet

The Lake Erie grape growing region includes not only New York shoreline counties, but also grape growing regions in Pennsylvania and Ohio. Because of the emphasis on Niagara and Concord grape production in this grape belt, the New York and Pennsylvania producers have developed joint funding for some Cornell University and Penn State University grape research and extension efforts. For this reason we will now be including on the mailing list for the News those growers in Erie County Pennsylvania. By way of introduction to our new readers, and as a refresher for others, the complex funding picture for New York and Pennsylvania grape research is explained in this issue by James Hunter, Director of the New York State Agricultural Experiment Station at Geneva and by Charles R. Krueger, Director of the Penn State Agricultural Experiment Station in University Park.

Regardless of state lines, there are many common problems in the production of grapes across Lake Erie shoreline counties, especially in New York and Pennsylvania. One of the biggest is always profit margins. Barry Shaffer, Lake Erie Regional Farm Management Specialist at Fredonia, NY, explains this bottom-line issue.

I like to use space in the first issue after harvest to expose readers to some aspect of research on post-production aspects of juice and wine grapes. In this issue you will find two articles on aroma and flavor characteristics of grape juices and v. v. es. There is increasing awareness by growers and researchers that many of these characteristics can be affected by vineyard practices.

To our new readers, welcome aboard. We hope you enjoy being updated by the News several times each year. If you have questions or would like to see certain research areas explained, please use the form at the bottom section of the rear cover. I will get answers to your questions if I can’t answer them myself.

(FUNDING continued from page 1)

and the Pennsylvania Agricultural Experiment Station to work with industry leaders and the President of the New York Wine and Grape Foundation to prepare a “Request for Proposal.” This is sent by the Director at Geneva to grape researchers in New York and Pennsylvania. Proposals are reviewed by members of the processing industry and growers who represent the Grape Production Research Fund and the Lake Erie Regional Grape Program. They coordinate their review and award process to ensure the best use of industry research funds to meet industry needs. Both groups (and others) make recommendations for funding projects to the New York Wine and Grape Foundation. They are reviewed by the Research Committee of the Foundation prior to the Board of the Foundation approving the use of State funds on a matching basis. Last year, the Foundation was able to provide $.41 cents for each dollar of money provided by the two funds. If more state funding becomes available, that matching ratio will improve. The Foundation awards the money to the Geneva Experiment Station, and the Station ensures that the money reaches Cornell and Penn State researchers to support the specific projects selected by the industry. The amount allocated for each project is determined by the industry and the Foundation.

The Geneva Experiment Station also calls for written progress reports each year for each project that is funded through the Foundation. These are reviewed by members of the industry prior to their making any decision on continued funding for a project supported by either the Grape Production Research Fund or the Lake Erie Regional Grape Program.

This past year, funds provided by the Lake Erie Program and/or the Grape Production Research Fund for viticultural research totaled $171,795 after the match was provided through the New York Wine and Grape Foundation. An important point is that researchers from Penn State as well as Cornell received funding through this channel. State boundaries are not a factor in determining the research projects to receive funds or the researchers who will receive them. Incidentally, you may be interested to know that other states are looking to the Lake Erie Regional Program as a model for pooling resources to support one program benefiting more than one state.

The New York Wine and Grape Foundation invites Pennsylvania and other grape growers to become members. Although the modest membership dues do not contribute a great deal to funding research in terms of total dollar contributions, the show of support is very important in attracting State matching funds. A membership application form is included in this issue of Grape Research News. The Foundation and all of us associated with the Lake Erie Regional Grape Program appreciate your active participation as a partner in the Program.
PROFITS DECLINING FOR LAKE ERIE JUICE GRAPE PRODUCERS

Barry Shaffer
Lake Erie Regional Farm Management Specialist
Fredonia Viticulture Laboratory
412 East Main St.
Fredonia, NY 14063

The grape industry located along the eastern shore of Lake Erie has a long history. Competitive pressure and changing consumer preferences pose significant challenges for the future of the industry. Growers have responded with increased mechanization and other cost cutting measures.

The Lake Erie Grape Farm Cost Survey (LEGFCS) was started in 1991 to:
1. Track costs and profitability for commercial grape producers as a group.
2. Establish benchmark data for comparisons between farms.
3. Identify production factors associated with varying levels of profitability.

Concord and Niagara grapes utilized for juice remain the base of the New York grape industry. Concord and Niagara are especially concentrated in the Lake Erie Grape Belt, which has over 90% of surveyed acreage planted with these two varieties. Grapes are being grown primarily on three different trellis systems, Umbrella Kniffen (UK), Hudson River Umbrella (HRU), and Geneva Double Curtain (GDC).

Farm numbers in LEGFCS grew from 14 in 1991 to 43 in 1995. Vineyard acreage in the survey rose from 1028 in 1991 to 4358 in 1995. In 1995, surveyed acreage was over 13% of the total acreage in the Lake Erie Grape Belt. Costs and returns were calculated on both a per-acre and a per-ton basis for comparison purposes across all farm sizes. Schedule F (farm tax) information was used because all growers have (continued on page 7)

Yields per acre varied much more than costs per acre. Average yields ranged from 4.8 tons per acre in 1993 to 8.3 tons per acre in 1991. Schedule F cost per ton ranged from a low of $161 per ton in 1994 to $245 in 1993.

Growers are challenged with 5 yr. ave. costs of $197/ton and 1995 cash prices around $165/ton!

Juice grape prices have trended downward from 1990 through 1995. Prices have rebounded for 1996, just in time for producers. Profitability has followed prices except in 1994 due to high average yields.
Taste vs. Aroma of Concord Grape Juices

Rhonda L. Smith¹, Terry E. Acree¹ and Robert M. Pool²

¹Department of Food Science and Technology
²Department of Horticultural Sciences
Cornell University
New York State Agricultural Experiment Station
Geneva, New York 14456-0462

To keep competitive with growers in other states and countries, Concord grape growers have adopted mechanized means of production, and have significantly raised vine yields. However, the industry realizes that gains in efficiency must not come at the expense of quality. Grape juice processors have noted a trend toward decreased fruit maturity that may or may not be related to changes in production. Regardless of the reason, Cornell researchers have developed efficient ways to estimate and reduce crop size. Although the effects of crop size and thinning on color, sugar, and acid have been documented, little is known about the effects of thinning on odor or other fundamental characteristics. For many red wine grapes minimal pruning results in higher tartrate/malate ratios, lower pH, higher titratable acidity, more intense color at a given degrees Brix. There have been just a few studies on how these horticultural practices affect the multivariate nature of flavors and none have been done on juice grapes.

We have begun experiments to determine the effects of processing and viticultural practices on the sensory properties of Concord grape juice using descriptive analysis procedures. The purpose is to produce a panel of trained tasters and a set of flavor descriptors that determine juice quality. The main objective of the initial experiment was to discover the effects of crop load on the types and intensities of flavors, particularly odorants, in Concord grape juice. Four brands of commercial grape juice were also assessed.

Sensory Evaluation

Sensory evaluation can be utilized to obtain a direct measure of what is perceived in grape juices through our senses. Coming from the fields of psychology and psychophysics, sensory techniques can make use of all five senses to analyze human response to consumer products. Although these techniques are just as expensive and time consuming as instrumental measures, they can be linked more directly to indices of quality. The types of tests include: consumer tests such as those that measure degree of liking; difference tests to see if a change in a product is noticeable; and descriptive analysis to evaluate a product's attributes.

A very useful technique for identifying and measuring the factors people use to assess character is descriptive analysis. Descriptive analysis requires considerable taster training and the development of methods for each new product to be analyzed. The panelists are screened to show that they can focus on the specific tasting task and consistently distinguish the important attributes of a given juice.

The first job for the panel is to taste and describe juice attributes and to develop a list of mutually understood terms for those specific flavor characteristics that differentiate samples. The panel leader then finds appropriate reference standards for each of these flavors. These are used to achieve a consensus on nomenclature and to align the panelists' concepts. Finally, blind testing is done in sensory booths, where the samples have been randomly coded and presented. Scaling of attributes is done using a line or a category scale, where each attribute is rated from, for example, "not present" to "very strong". If the panelists are consistent and the products are different enough, the products can be differentiated based on the ratings given for each attribute.

Grape Juice Experiment

To examine the sensory characteristics of grape juice and explore the use of descriptive analysis for juice quality, we initiated a study of the effects of machine thinning on the sensory properties of Concord grape juice. Minimal pruned vines were thinned to different crop loads with a horizontal impactor harvester operating at 0, 260, 280, and 315 rotations per minute at four weeks after bloom (1260 Growing Degree Days). Twelve batches of grapes, representing four thinning rates (rows) and three samples (vines), were collected, crushed and pressed.

A group of panelists was screened and trained for descriptive analysis. A set of reference standards was presented to the panelists for the attributes they selected as a group (Tables 1 and 2). The panelists placed vertical marks on a line scale to indicate the perceived intensity of each attribute.

After the raw data were collected, a statistical technique to compress the variation in the attributes into new, combined variables, Principal Components Analysis (PCA), was performed for three groups of attributes: smell, aroma and taste/mouth feel. The graphs in Figures 1 and 2 do not show all the variation in the data. They do show the distribution of PC1 vs. PC2 which are the new variables formed from the average sensory ratings of the trained panel. The graphs show that the juices were not distinguished on the basis of taste or mouth feel attributes, but instead on the basis of differences in smell and aroma.

Smell attributes (before drinking) differed only slightly from aroma attributes (after drinking). While there is evidence that
Table 1. Final ballot and standards for smell and aroma.

<table>
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<tr>
<th>Descriptor</th>
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<tr>
<td>Fruity</td>
<td>Ethyl butyrate</td>
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<tr>
<td>Berry</td>
<td>Preserves from four fruits</td>
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<tr>
<td>Foxy</td>
<td>Mixture of ortho-aminacetophenone &amp; methyl anthranilate</td>
</tr>
<tr>
<td>Smoky</td>
<td>Liquid smoke</td>
</tr>
<tr>
<td>Caramel/cotton candy</td>
<td>Furaneol</td>
</tr>
<tr>
<td>Musty/moldy</td>
<td>2-Methylisoborneol</td>
</tr>
<tr>
<td>Vegetative</td>
<td>Green pepper</td>
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<tr>
<td>Vinegar</td>
<td>Vinegar</td>
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</table>

"Smell" was measured prior to drinking and "aroma" was measured after drinking.

Table 2. Final ballot and standards for taste and mouth feel.

<table>
<thead>
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<th>Descriptor</th>
<th>Standard</th>
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<tbody>
<tr>
<td>Sweet</td>
<td>Fructose</td>
</tr>
<tr>
<td>Acidic</td>
<td>Tartaric acid</td>
</tr>
<tr>
<td>Bitter</td>
<td>Quinine</td>
</tr>
<tr>
<td>Astringent</td>
<td>Tannic acid</td>
</tr>
<tr>
<td>Thickness</td>
<td>Corn syrup</td>
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thinning may have affected odor intensities more than those of taste and mouth feel, this research has not shown a noticeable pattern in the effect of thinning on odor character. In spite of this, it is clear that one must examine more than just the taste and mouth feel components when assessing Concord juice.

Needs for the Juice Industry

More research will be done on the effects of different factors such as horticultural treatments on the flavor chemistry and sensory properties of grape juices. Applications of those results would be to relate the sensory properties of grape juices to their chemical composition and to use trained descriptive sensory panels to determine specific definitions and standards of quality. Once the critical determinants are identified, researchers will be able to optimize production practices which increase juice quality and so enhance the value of New York-grown Concord grapes.

References:


Flavor Measurement. Assessing grape and wine flavors involves the measurement of odor and taste active chemicals. These measurements fall into two broad and distinct categories: chemical methods and sensory methods. The quality of human experiences when they eat and drink are more directly measured by sensory tests. Furthermore, all chemical measurements must be correlated with sensory data in order to be meaningful in terms of consumer experiences. In the end science can contribute to our understanding of flavor quality when we are able to measure the chemical flavorants in grapes and determine their impact on perception and the effects of viticulture on their concentration. At the core of this problem is the interface between chemical measurement and sensory testing. At that interface is the technique called GCO (gas chromatography–olfactometry). This article reviews GCO technology, describes some of the results obtained with the technique, and speculates about future applications for GCO in grape and wine assessment.

Odor chemicals are most commonly measured for three properties: dosage, character, and potency. GCO or “GC-Sniffing,” as it is often called, is used to bioassay the potency and character of odorants. For example, β-damascenone, an odorant with an apple sauce-like character important in both Concord juice and Niagara wines, has been detected by GCO at 50 femtogram (10^{-15} g). Besides being extremely sensitive, the GCO can also be used to enhance the measurement of odor perception in traditional sensory tests like threshold measurement or descriptive sensory analysis. For example, results from descriptive sensory tests are usually averages of results from several different people. These averages are meaningful if all the panelists have used the same words to describe identical stimuli. GCO can be used to train panelists for descriptive analysis by associating extremely pure doses of standard odorants with descriptors. Measuring flavor chemicals individually, whether the measurement is chemical or perceptual, cannot tell us how flavorants work in the “natural” mixtures that make up grapes and wines.

Understanding Mixtures. A simple way to understand mixtures is to consider how a single chemical affects the flavor of a mixture. Flavor chemicals create positive perceptions, a quality response, when they are present at “appropriate” amounts, e.g., not too low or too high.

What does it mean to be appropriate? Consider the way flavor chemicals work to create a sensation. (Remember the presence of a chemical below its flavor detection threshold cannot affect the flavor directly.) Flavorists describe natural flavors as a mixture of distinctly different flavor sensations, e.g., sweet, sour, green, cucumber, anise, etc. The aroma of a specific mixture, e.g., Niagara wine, can be divided into three classes of odors based on sensory or perceptual function: nominals, congeners, and diversifiers.

1) Nominals are chemicals that cause you to think of a name similar to the name of the product, e.g., methyl anthranilate is a nominal aroma in Niagara, Concord and Carlos. However, there is no methyl anthranilate in Carlos, o-aminooacophenone is the nominal aroma in this *Vitis rotundifolia* variety.

2) Congeners are chemicals that combine with nominals to create the character, e.g., beta-damascenone in combinations with methyl anthranilate creates most of the character of Niagara; however, beta-damascenone alone or at high concentration in Niagara does not smell like any specific grape. It smells like apple sauce.

3) Diversifiers are chemicals that create complexity, patina and subtle differences. These chemicals usually have very different flavors from the nominals and congeners, e.g., diactyl, with its buttery toasted odor in concentrations near the threshold, adds a distinctive character to wines that have
undergone malolactic fermentation. However, at higher concentrations the odor is inappropriate, causing an off-odor or odor defect.

No chemical is inappropriate by its very nature. Flavor chemicals are inappropriate only in the context of the goals of the wine maker and ultimately the consumer. For example, the presence of methyl anthranilate in a Chardonnay wine is probably inappropriate; it is entirely appropriate for a Niagara wine. Clearly, when a diversifier becomes so strong that it overpowers the nominals and congeners, it can become inappropriate. Then the task of the wine maker is to modulate the chemistry of the wine so that appropriate levels of nominals, congeners and diversifiers are present.

*This article was extracted from the 1996 Proceedings of the 25th Annual New York Wine Industry Workshop, published by Communications Services, Jordan Hall, New York State Agricultural Experiment Station, Geneva, NY 14456, with permission from the author and Thomas Henick-Kling, editor.*

[Graph: '95 profitability lower due to low prices and average yields]

The average juice grape farm needs over 6 tons per acre with existing vineyards to remain profitable. This is obtainable, since 7 out of 13 LEGFCS farms have 5-year average yields of over 7 tons per acre! Producers face many challenges every year but rising prices should help profitability for all growers in 1996 and beyond.
Finger Lakes Grape Specialist Leaves Cooperative Extension

David Peterson, Finger Lakes Area Grape Extension Specialist, has recently left his extension position to join Swedish Hill Winery in Romulus, New York. Dave will thus be joining the winery, owned by his family, which has grown from its original production of about 3,000 gallons to its current production of over 80,000 gallons. He will continue to work on a part-time basis for the Finger Lakes Grape Program through the end of 1996 (about one day per week in the Yates County Office). While in that capacity, Dave will be interpreting grapevine petiole analyses and will also be involved in the initial planning of the 1997 Finger Lake Grape Growers’ Convention.

Since returning to the Finger Lakes from the Mountain Grove, Missouri experiment station in 1989, Dave has served as grape specialist for the multi-county Finger Lakes Grape Region, with his headquarters in Penn Yan, New York. He has been heavily involved in Cornell Cooperative Extension programs for growers and processors of the area’s and New York’s grapes. He has served professionally as an officer in several societies, such as the American Society for Enology and Viticulture, and has diligently worked on grape program development at the county, regional, state and national levels. His newsletters and his expertise have been requested by a great many people outside of the Finger Lakes. Dave also forged close ties to the grape/wine research-extension programs at Cornell, especially those at the Agricultural Experiment Station in Geneva. Over his seven years in the system, he involved himself in research which could benefit growers, such as vineyard nutrition, organic grape growing, and ground cover management.

By training, by his family background in the business, by his eagerness to find answers, and by his enthusiastic interest in grape growing, processing and profitability, Dave has been the ideal person to serve the area’s growers and processors. Although he is leaving the Cornell system, Dave will remain an active participant in committees and educational programs as he helps take the family enterprise into the next century. We wish him well in his new role and thank him for his efforts to benefit our industry.

Richard Derksen Leaves Cornell

Richard Derksen, Assistant Professor in the Department of Agricultural and Biological Engineering at Cornell University in Ithaca, left Cornell in October to join the USDA-ARS located in Wooster, Ohio. While at Cornell, Rich had responsibilities in the development of more efficient sprayer machinery for grapevines and other crops. His new position includes leading a USDA research project on protection of fruits, vegetables, nursery and greenhouse crops.

Awards:

Roger Magarey, a Cornell Ph.D. student in the Department of Plant Pathology at the New York State Agricultural Experiment Station in Geneva, NY, won the Student Paper Competition at the July meeting of the American Society for Enology and Viticulture/ Eastern Section, in Rochester, NY. Roger presented his paper, "Prediction of Vineyard Site Suitability in New York State" at the meeting, held in conjunction with the 4th International Symposium on Cool Climate Viticulture. His co-authors on the paper were Steve DeGloria (IRIS, Cornell University), Robert Pool and Robert Seem. A $500 prize accompanied the award.

Marco Dal Bo, a Cornell student in the field of pomology, won a Student Scholarship from the ASEV-Eastern Section at its annual meeting in July in Rochester, NY. Marco was a grape breeder for the Brazilian government before coming to the New York State Agricultural Experiment Station to work with Professor Bruce Reisch in 1994. He is working on the development of molecular markers for early selection of seedlings in grapes, specifically markers useful in selecting resistance genes for powdery mildew. Dal Bo expects to receive his Ph.D. for this thesis work in August 1998.

Upcoming Events:

The New York State Horticultural Society Show will be held January 8 & 9, 1997, at the Thruway Marriott in Henrietta, NY. The Grape Program will be on January 8. Juice grape production will be featured in the morning talks and wine grape production in the afternoon.

10:30-11:15: Growing Quality Concord Grapes Competitively in New York, Dr. Robert Pool, Professor of Viticulture, Cornell University.
11:15-Noon: A Complete System for Vineyard Mechanization, Dr. Justin Morris, Professor of Viticulture and Enology, University of Arkansas.
1:30-2:15: New Horizons for Wine Grape
Quality Improvement, Dr. James Wolpert, Extension Viticulturalist, University of California at Davis.

2:15-3:00: Alternative Varieties for Wine Grape Production in New York, Dr. David Peterson, Winemaker, Swedish Hill Winery, Romulus, NY.

3:00-3:30: Grape Growing in Japan: An Example of Value-added Viticulture, Dr. Robert Pool, Professor of Viticulture, Cornell University.

Winegrape Production in the Midwest takes place on January 14 & 15, 1997, at the Ramada Inn, 798 Ferguson Rd, Benton Harbor, MI. Sponsored by the Heartland Grape and Wine Coalition (Ohio State, Michigan State, and Purdue Universities). This is a 2-day school for beginner and novice grape growers. This conference brings together a wealth of technological expertise for those who are considering, or just beginning a viticultural enterprise. It will have a series of presentations covering the important topics in viticulture, but also provide an opportunity for informal discussion and exchange of ideas with others considering or already engaging in premium winegrape production. Participants will also have an opportunity to sample Midwest commercial and experimental wines. Fee charged; after Dec. 1 there is a late fee charge. For further information contact: MSU-SW MI Research & Ext. Center, 1791 Hillandale Road, Benton Harbor, MI 49022. Space is limited to 100 on a first come basis.

The 1997 Lake Erie Region Grape Grower Conference will be held Friday, February 14, at the Central School in Westfield, NY. Information can be obtained from Ms. Linda Aures at the Lake Erie Regional Grape Program Office, Vineyard Laboratory, 412 East Main St., Fredonia, NY 14063. Phone: 716-672-2191.


Retired Cornell Researcher and Valued Grape Industry Friend, Don Crowe, Dies

Donald Crowe, who formerly managed the experimental vineyards at Cornell's Vineyard Laboratory, quietly passed away at his home in Fredonia November 12, 1996. Cornell University and its professors have received recognition for the important advances in viticulture which have emerged from the Vineyard Laboratory, and Don was instrumental to the success of much of that research. Don Crowe's career exemplifies the dedication, hard work and creative thinking that has characterized the staff of the Vineyard Laboratory, and which has created such a productive environment. He will be missed as an inspiration, confidant and friend to Cornell faculty and the grape industry.

Don began work at the Vineyard Laboratory upon his release from Army Air Force service soon after the end of World War II. That was the beginning of what was to become a lifetime of service to Lake Erie grape growers. After working with entomologist Dr. Fred Taschenberg for several years, Don became Dr. Nelson Shaulis' right and left hand man at the Lab. Their accomplishments included development of the Geneva Double Curtain training system, development of the mechanical grape harvester, and advances in vineyard weed control techniques, among others. Don retired from Cornell in 1978, but that was only the first of several "retirements" that Don made from the grape industry. He first worked as a grower advisor and then as a consultant. In those capacities he was an invaluable resource to the industry and to the University. During this time, he assisted Dr. Robert Pool in developing mechanical methods of crop control in grapes. His long experience allowed him to provide growers with excellent advice, but more importantly, he continually made his Cornell colleagues aware of industry research needs and research opportunities. He maintained an active involvement in the viticulture research of the Laboratory until his death.

Don's contributions were well recognized by his peers. He was the first recipient of the "Grape Industry Person of the Year" award in 1987. Don's wife Rita, also a valued contributor to the programs of the Vineyard Laboratory, pre-deceased Don this last summer. We will miss Don's inspiration, but are grateful that we were able to benefit from his example.
This newsletter and the extensive grape research it is based on are made possible by funding from the New York Wine & Grape Foundation. The Foundation's budget depends on private sector contributions which are matched by the State of New York.

If the Foundation's research program, and your access to information through this newsletter are to continue, we need your support through modest membership dues—a rate schedule and membership application can be found below. Membership in the Foundation is a sound investment in the future of your own business and a reflection of your commitment not only to the organization, but also to the industry. Please join your neighbors and industry associates in forging a more productive and profitable future.

Thank you!

Application for Grape Grower Membership

Please print all information legibly.

NAME

NAME OF VINEYARD (if applicable)

STREET, P.O. OR R.D. ADDRESS

COUNTY______________________________CITY (TOWN) & ZIP______________________________

TELEPHONE______________________________TOTAL GRAPE ACREAGE (optional)

<table>
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<th>1997 Membership Schedule</th>
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<tr>
<td>Dues (circle)</td>
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After completing this form, please send it and a check for the appropriate amount payable to:

New York Wine & Grape Foundation
350 Elm St., Penn Yan, NY 14527
THANK YOU!
Gratitude is expressed to those organizations whose support makes possible ongoing and valuable research activities for the benefit of the State's grape industry. Major funding is provided by the New York State Wine & Grape Foundation; the Grape Production Research Fund, Inc.; and the J.M. Kaplan Vineyard Research Program.

New York Wine & Grape Foundation
350 Elm Street
Penn Yan, NY 14527

Got A Question?  We are trying to address the many questions from grape growers and processors that come to Cornell's grape research community. We invite you to write to us at Grape Research News to bring to our attention any questions you have about grapes. We will see to it that those questions are answered by someone knowledgeable in the area of your concern.

Save yourself a long distance phone call. Put it in writing on the back of form below, cut it out, and send it to us.

Name__________________________________________
Address________________________________________

Mail to:

Martin C. Goffinet
Editor, Grape Research News
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New York State Agricultural Experiment Station
Geneva, NY 14456